





USGS NSF GRIP Opportunity

● USGS Center:	Eastern Geology and Paleoclimate Science Center
● Project Title:	Peatland responses to centennial and millennial- scale changes in North Pacific hydroclimate
● Project Hypothesis or Objectives:	<p>Peatlands store roughly one-third of the world's soil carbon and are thought to have been major contributors to changes in atmospheric carbon dioxide and methane concentrations on glacial and interglacial timescales, but questions remain about the controls on the rates of their expansion and accumulation, and how these patterns have changed in the Holocene. Many peatlands, particularly those in boreal regions, are becoming more vulnerable to disturbances from fire and permafrost thaw, but also to more subtle changes in temperature and hydrology. In addition to analysis of physical peat properties, we will use peat cores from Alaska for understanding past hydroclimate regimes of the North Pacific, using a combination of plant macrofossils and stable isotopes. The plant macrofossils, especially bryophytes, provide information about past water table position and the degree of groundwater input to a site. The stable isotopes will help determine past precipitation and evaporation regimes, including changes in large-scale circulation changes over the Holocene.</p> <p>The goal is to build on a relatively novel proxy of using plant cellulose in peat for oxygen isotope analysis. Using a modern dataset of bryophytes and water from across a large hydrological gradient over a small area, we plan to refine our understanding on the controls on oxygen isotope fractionation in peatland plants and implement this understanding to peat core analysis.</p>
● Duration:	12 weeks or longer (flexible)
● Internship Location:	Reston
● Area of Discipline:	Paleoclimate, paleoecology (botany), geochemistry
● Expected Outcome:	This research will expand upon a small but growing set of peat cores from across Alaska, which shows relatively strong spatial and temporal coherence in isotopic shifts. The intern will gain valuable

professional experience and develop research skills needed to succeed as a research scientist, from hypothesis development to laboratory analysis and data interpretation to ultimately presentation of results. USGS will benefit from hosting the intern by supporting the next wave of students interested in careers in science. The intern will also help us achieve our research goals.

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|  Special skills/training Required: | The intern should have an interest in terrestrial paleoclimate, wetlands, basic biogeochemistry and geochemistry. An interest in botany is also a plus, but not required. Prior experience working at microscope and performing basic chemistry for sample preparation is requested. The intern should have analytical skills for working up and interpreting data. |
|  Duties/Responsibilities: | The intern will be responsible for laboratory analyses, including high-resolution measurements of peat properties and plant macrofossils. Macrofossils will also be used for radiocarbon dating. Species-specific samples will be prepared for oxygen isotope analysis. Intern will also be responsible for data analyses, plotting data, and interpretation of results, and ultimately writing or helping write a manuscript or series of manuscripts on the data outputs. The intern should also be prepared to present the research results at national and international conferences. |
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